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REPORT ON SANITARY SURVEY OF BUREAU OF RECLAMATION INSTALLATIONS IN NORTH PLATTE RIVER DISTRICT, JULY 19-23, 1948

PUBLIC HEALTH SERVICE, DENVER, COLORADO

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A survey was made to evaluate sanitation facilities at various installations and constructionprojects of the Bureau of Reclamation in the North Platte River District in Wyoming. Installations investigated are located at Seminole, Kortes, Pathfinder, Alcova, Mills, Guernsey, and Lingle. Detailed findings for each installation are presented, as well as recommendations for correction of obvious defects. Consideration was given to general environmental sanitation problems covering recreational use of the reservoir.

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REPORT ON SANITARY SURVEY OF BUREAU OF RECLAMATION INSTALLATIONS IN NORTH PLATTE RIVER DISTRICT

Introduction

This investigation was made at the request of Region 7, U. S. Bureau of Reclamation, during the period July 19-23, 1948.

The purpose of this survey was to evaluate sanitation facilities at the various installations and construction projects of the Bureau of Reclamation in the North Platte River District. Installations and projects visited were all located in the state of Wyoming. Bureau of Reclamation installations are located at Seminole Dam and Power Plant, Kortes dam site camp, Pathfinder Dam, Alcova Dam, Mills Camp (Casper), Guernsey Dam, and Lingle. A construction project is located at Kortes dam site about two miles downstream from Seminole Dam. The contractor maintains a camp at Kortes Dam. Detailed findings for each installation are presented herein below, together with recommendations for correction of obvious defects. In addition, consideration has been given to general environmental sanitation problems covering recreational use of the reservoirs.

Summary

Investigation was made of the sanitation at installations at projects under the jurisdiction of the U. S. Bureau of Reclamation in the North Platte River District in Wyoming. Installations are located at Seminole, Kortes, Pathfinder, Alcova, Mills, Guernsey, and Lingle. A construction project is underway at Kortes Dam and facilities operated by the contractors at this location were observed.

Recommendations for each installation may be found under its respective heading.

Much of the region covered by the North Platte projects is sparsely settled. There does not appear to be any actual or potential intensive recreational use of reservoir areas. Problems arising from this source should be of relatively minor importance. However, should development of extensive recreational areas on the reservoirs become advisable or desirable, adequate sanitary facilities should be provided for those using the areas. Further, no discharge of any amounts of raw sewage directly into the waters of any reservoirs should be permitted.

Seminole Dam, Power Plant, and Reservoir Area

The Bureau of Reclamation maintains a permanent housing area on a hillside above the dam site and power plant. Houses and buildings are of permanent type frame construction and are adequate. The general operation and maintenance of the camp appears to be at a relatively high level

despite shortage of personnel for general maintenance purposes. Water supply is obtained from infiltration works located in the bed of a creek. The works consist of a concrete subsurface dam and collection gallery under the stream bed. Water from the collection well is pumped by means of an electrically driven two stage displacement pump against a 600 ft. head to a 50,000 gallon wood covered concrete reservoir located above the campsite. The roof of this reservoir is in need of repairs. Part of the roofing material is torn off and contamination can enter through the sheathing. Concrete roofs are preferable to other types for reservoir coverings. The camp manager proposes to cover the present roof with felt paper and chicken wire and then stucco the entire surface with cement stucco, making a firm bond with the top of the tank. Several privately owned and occupied houses are in the immediate vicinity of the reservoir. Water is presently untreated but a Wallace & Tiernan motor driven hypochlorinator is to be installed in the pump house to disinfect the water going to the storage reservoir as soon as necessary auxiliary parts are obtained. Water samples indicate the water is usually of satisfactory quality. Occasional unsatisfactory samples warrant the installation of the chlorinator on the system.

Note: Chlorinator installation is mandatory for all water supplies operated by the Bureau under Par. 6.5.44 of the Bureau of Reclamation Manual, Vol. IX.

Sewage disposal is by means of a collection system and a two-compartment concrete septic tank, 10' x 5' x 5' effective size, located adjacent to a small creek. Sludge drains from the tank discharge directly into the creek. The design of this septic tank is unusual in that a bar screen is provided in a special inlet chamber. This screen has 3/4" openings. In operation, the screen becomes clogged and the sewage then overflows the inlet chamber rather than entering the tank. A shortage of maintenance personnel at the camp makes frequent cleaning impossible. It is reported that daily cleaning of the screen does not correct this situation. Screenings removed from the inlet chamber are deposited on the ground adjacent to the tank. In view of the operating experience with this bar screen, it is suggested that it be removed from the inlet chamber and that the inlet pipe be extended to permit all sewage to flow directly into the tank. The use of a bar screen is not indicated on a tank of this size with the type of sewage treated. Paper and other normal constituents will be handled by the normal digestion process without difficulty. If sludge drain lines are of 6 inch pipe, little difficulty will be experienced in removing sludge.

Garbage and other wastes are hauled to a dump area some distance from the camp site.

The most serious health hazard at this camp appears to be the difficulty in reaching the site by road from either Rawlins or Casper during bad weather. Since no medical care is available at the camp, except first aid, dire consequences may result in the event a serious accident or illness should occur to personnel quartered at the camp. Some cooperative arrangement should be made between the Bureau of Reclamation and the State and

local governmental agencies with regard to the necessary measures to be taken to provide for relatively adequate access to the camp during inclement weather.

Although this reservoir is located in a rather remote area, there is a certain amount of usage of the lands adjacent to the reservoir for hunting, fishing, and camping purposes by individuals when access is readily accomplished. General usage of the reservoir area is for stock raising. Wild game is relatively plentiful in the region. Some consideration reportedly has been given to the establishment of a recreational area on the reservoir for use of campers and sportsmen. If such a development is undertaken, adequate sanitation facilities should be provided for use by those visiting the region. Such facilities would include safe water supplies, adequate sewage disposal, and adequate garbage disposal.

In view of the above, it is recommended that:

1. The available hypochlorinator be installed on the water system as soon as practicable.

2. The reservoir cover be repaired as soon as practicable. The use of cement stucco as suggested by the camp manager would be an adequate and relatively permanent solution to the problem in lieu of a concrete slab cover.

3. The bar screen be removed from the inlet of the septic tank and the inlet pipe extended into the tank proper.

4. The sludge drain from the septic tank discharge to a drying bed or isolated lagoon area and not directly into the stream. If sludge is pumped from the tank, it should be conveyed to an isolated spot for burial.

5. If a camping and recreational area is developed on the reservoir, adequate facilities for safe water supplies and other sanitation features be provided. Requirements of the State Board of Health should be followed in these matters.

6. Adequate road maintenance be provided to insure access to and from the camp during inclement weather. In the absence of adequate roads, a "weasel" or other similar self-tracking vehicle should be provided for emergency use.

Kortes Dam Site and Camps

The Kortes Dam site is located about two river miles downstream from Seminole Dam. This dam is presently under construction. Camps for Bureau of Reclamation personnel and for construction personnel are maintained in an area along the North Platte River about two miles below the dam site. Houses in the camp areas are of semi-permanent frame or temporary steel quonset hut types. Utilities serve both the Bureau of Reclamation

and the contractor's camp.

Water supply is obtained from a dug well located below the bluff along the river bank. The well is about 8 or 10 feet square and is cribbed with heavy timbers. Pumps are mounted on timber beams directly above the open water surface. Well is covered by the pump house. Water is chlorinated but no systematic records are maintained of chlorine residuals or of operation procedures. Daily chlorine readings should be made so as to maintain free chlorine residuals of 0.15 to 0.2 from the taps in all parts of the system. Storage is by means of a covered reservoir of 10,000 gallon capacity. Water quality is unknown, and in view of reportedly widespread gastro-enteritis in the camp areas, samples should be submitted to the State Board of Health at Cheyenne for check at least twice a month.

Sewage disposal is by means of a collection system of vitrified clay pipe and a septic tank. The septic tank is constructed from a 250 barrel steel cement silo. The outfall line from the tank was broken and the effluent is discharging on the river bank, producing a large bed of sludge. The tank was not functioning properly as evidenced by large amounts of suspended matter in the effluent. Sludge drain from the tank connects to effluent outfall so that sludge normally drains to stream. Better design and maintenance of sewage treatment facilities for the camp area is indicated.

Flies were fairly abundant in the camp area and along the river bank in the vicinity of the sewer outfall. There was some evidence of fly breeding in the sewage sludge accumulated along the outfall below the break in the outfall line. Further, there was visual evidence of the indiscriminate use of the ground area on the bluff along the river and behind the shops and dormitory area as a depository for excreta. In addition, the area along the river and behind the dormitory area is extensively used as a dump, although a dump area had been designated at some distance from the camp sites. A generalized fly control and cleanup campaign is indicated. A residual type D.D.T. spray should be used in all buildings, and especially about the mess hall, dump area, and the few privies located in the camp area for the control of flies. The river bank and bluff should be cleared of all dumped waste materials and proper measures taken for their disposal at the designated dump area. The use of nearby ground areas rather than the provided toilet facilities should be strictly forbidden. There is little excuse for this sort of thing in a well planned and well managed camp.

The food handling facilities operated by the contractor were inspected. These facilities serve some 600 meals per day. The following defects were observed:

Walls and ceilings. Not washable to height of splash but were reasonably clean.

Doors and windows. Screening not effective.

Toilet Facilities. No toilet facilities provided except in another building.

Lavatory facilities. None provided except in another building.

Construction of utensils and equipment. Chipped enamelware pitchers were in use.

Cleaning of equipment. Some tables and work benches with cracks on surface and with linoleum covers not properly fastened around edges, permitting accumulation of dirt.

Cleaning of utensils. Dishwashing practices were unsatisfactory due to improper facilities.

Bactericidal treatment of eating and cooking utensils. No bactericidal or sanitizing treatment used. Should have three compartment sink and proper long handled racks for dishwashing so that proper sanitizing by means of either chemicals or hot water (over 170°F. for two minutes) may be carried out.

Refrigeration. No thermometers to determine if temperatures are below 50°F. as required.

Disease control. Section 9 not posted.

In general, sanitation at both of these camps was not satisfactory. With careless handling of water supply, sewage disposal, and inadequate food handling practices, there is little wonder that gastro-enteritis upsets are prevalent. It is recommended that more attention be given to the maintenance of adequate sanitation in general and, specifically, that:

1. Proper well construction be undertaken if camps are to be maintained for any great length of time. A safe well can be constructed at reasonable cost even for a temporary installation such as this and should be provided for the protection of personnel engaged on this project.

2. Daily records be kept of free chlorine residuals in water supply and that samples of water be submitted to the State Board of Health laboratory at Cheyenne twice monthly for bacteriological check.

3. Adequate sewage treatment facilities be provided & maintained in proper operating condition. It is realized that these facilities are of a temporary nature and that a certain amount of improvising can be justified. Nevertheless, reasonably adequate facilities should be provided and maintained in proper operating condition. Reference is made to Reclamation Manual, Vol. IX, Part 6, Chapter 6, as to the design of camp sewerage systems.

4. A fly control program be inaugurated and dumping about the habitable areas be eliminated.

5. Sanitation regulations be enforced to prevent defecation on ground area about camp.

6. Defects in food handling facilities be corrected, especially those concerning dishwashing facilities, and proper toilet and lavatory

facilities for mess hall employees be installed. A three-compartment sink and proper dishwashing and sanitizing techniques are necessary for the protection of those using the mess facilities.

Pathfinder Dam.

This dam is located on the North Platte River about 40 miles above Casper, Wyoming. This is an old installation, the dam having been constructed about 1909.to create storage for irrigation purposes. The Bureau of Reclamation maintains two houses for operators at the dam site. These houses are constructed of masonry and are served by individual water supplies and sewage disposal systems

The sources of water for both living quarters are separate spring areas located several hundred yards from the dwellings. The water from the seepage areas is collected in cisterns. Flows were quite small at the time of the survey. The cisterns are not properly constructed so as to afford maximum protection to the water supply. These cisterns should be constructed of water-tight concrete with approved box lid manhole covers, and protected from surface wash and flooding. Spring areas should be developed to produce a better flow. Present flows are not adequate for combined domestic use, irrigation, and fire protection. It is suggested that spring flows be used for domestic purposes only and that water for other purposes be obtained by direct pumpage from the reservoir. Catchment areas should be fenced to prevent access of livestock to the immediate spring areas. It is suggested that larger size perforated pipe be used in the collection system. Water quality from the present installations would appear questionable. It is suggested that samples be sent to the State Board of Health for examination as to safety at least twice a month.

Sewage disposal is accomplished by means of leaching cesspools which are in poor repair. The wooden covers have rotted out and collapsed, creating a hazard as well as interfering with the proper operation of the system. It is suggested that septic tanks and tile drain fields would be a better solution to the sewage disposal problems at these residences. The hillside location would make sludge drains and sludge beds a practical addition to the tanks.

Garbage and other wastes are conveyed to a dump area which has apparently been in use for years. No nuisance conditions were observed. Burial of garbage is suggested.

No generalized usage of the reservoir area for recreational purposes was reported.

In view of the above, the following recommendations are made:

1. Better water supply systems should be developed for the living quarters at Pathfinder Dam, with emphasis on protecting the supplies from contamination and providing a somewhat better and more protected spring development.

2. Water samples should be submitted to the State Board of Health for bacteriological examinations at least twice a month.

3. A pump should be installed to furnish reservoir water for irrigation and fire protection purposes.

4. Adequate sewage disposal systems should be constructed at the quarters. Septic tanks, leaching fields, and sludge beds are suggested.

Alcova Dam and Reservoir.

This dam is located about 30 miles upstream from Casper, on the North Platte River, and approximately 10 miles below Pathfinder Dam. This is an equalizing reservoir for irrigation waters. The Bureau of Reclamation maintains an operator's residence and a garage and shop at this installation.

Water supply for the installation consists of a 6" x 50' drilled well terminating in a concrete pit about 6 feet deep, which has no drain. Pump casing extends about 12 inches above the pit floor. The electrically driven jet type pump is placed upon a foundation block elevated about one foot above the pit floor. There is evidence of the pit having been flooded in the past. A positive drain discharging to the surface should be installed at the lowest point in the pit to prevent flooding. Pump discharges to a pressure tank in the pump house. Water quality is unknown and samples should be submitted to the State Board of Health in Cheyenne for bacteriological examination at least twice a month.

Sewage disposal is accomplished by means of a leaching cesspool which has been replaced recently by a new installation. The use of a septic tank and leaching field is suggested as a more satisfactory type of installation. A two-hole privy is maintained near the garage and shop for use by stream gauging crews of the Geological Survey. It is suggested that since water under pressure is available, a toilet and lavatory be installed in the shop for use by these survey crews and that the privy be eliminated.

Garbage and other wastes are hauled to a remote area and dumped. No nuisance results were indicated.

There are no reports of extensive use of the reservoir area for recreational purposes even though it is easily accessible from Casper and is located close to a main highway.

Mills Camp (Casper, Wyoming).

The camp is located about two miles west of Casper at Mills and serves as the domicile area for Bureau of Reclamation field employees of the North Platte River District office. This camp was still in the process of construction at the time of this investigation. Buildings are of prefabricated frame construction. In addition to homes for employees there

are several warehouses and office buildings located in the camp area. Temporary living quarters have been constructed in the basements of several completed houses pending completion of the current construction program. There is evidence that the basements are subject to flooding from entrance of storm water through casement windows. These basement quarters are sub-standard as living accommodations and will not be used as such after completion of present housing program.

Water supply for the camp area is obtained from the town of Mills, Wyoming. The source of supply is a well 5' in diameter x 30' deep located on the bank of the North Platte River. Well is cased with concrete to the bottom and is protected against surface contamination. This well is pumped by a 750 g.p.m. centrifugal pump driven by a natural gas engine. Pump delivers to a 100,000 gallon elevated steel tank which floats on the system. Water pressures of 45-50 lbs. are maintained on the system. Pump is manually controlled and is operated twice daily to keep storage tank filled. Water is treated by chlorine about three times weekly by means of a home made chlorinator using chlorine gas. Residuals are adjusted at about 0.4 p.p.m. at the plant. Water quality is satisfactory as determined from routine monthly tests by the State Board of Health.

Sewage disposal from the camp area is accomplished by means of a collection system of clay pipes which currently discharge into the North Platte River. A primary sedimentation treatment plant is under construction for treatment of the sewage. This plant consists of what appears to be a circular steel Imhoff or two-story type tank. Construction work has been suspended on this project because of difficulties encountered with ground water conditions existing at the plant site. The outer steel shell is in place but the work area was flooded and water could not be removed by usual pumping methods. The exact design and operation of this proposed treatment plant could not be ascertained at the time of the investigation but the plans have reportedly been approved by the Wyoming Board of Health for installation. The construction of this plant should be carried on concurrently with the construction in the camp area so as to avoid discharge of increasing amounts of raw sewage into the river.

Information with regard to garbage and waste disposal from the camp area is lacking at this time.

In view of the above, it is recommended that:

1. Emergency basement living quarters be discontinued at the camp as soon as adequate quarters now under construction are completed.

2. Efforts be made to have town water supply chlorinated continuously rather than on an intermittent basis as at present.

3. Construction of the sewage treatment plant be completed as soon as practicable in order to cease discharge of raw sewage into the river.

Guernsey Dam, Power Plant and Reservoir Area.

This installation is located about three miles west of Guernsey, Wyoming. Shops, offices, and living quarters for Bureau of Reclamation employees are located at the dam site. A museum and recreational facilities were installed at the reservoir area by the Civilian Conservation Corps under direction of the National Park Service prior to the late war. These facilities are currently operated by the Bureau of Reclamation.

Buildings at the camp area are of permanent type frame construction. The museum building constructed by the C.C.C. is of masonry.

Water supply for the main camp area is a well 3' in diameter x 50' deep located in the canyon below the power house. The well is lined with concrete pipe to the bottom. Pumping installation consists of one 50 g.p.m. electrically driven centrifugal pump and one 15 g.p.m. electrically driven displacement type pump used as auxiliary. Both pumps deliver against a 320 ft. head. Storage consists of two 2,000 gallon galvanized iron tanks located on a hill above the camp. Storage is very inadequate to supply all water uses, particularly during the summer when irrigation is practiced. Fire protection is grossly inadequate. Adequate storage should be provided for this camp.

Buildings across the canyon are supplied from the well constructed to serve the old C.C.C. camp. This is a dug well of unknown size located on a bench above the river and covered by the pumphouse. Pumping equipment is an electrically driven centrifugal pump of about 25 g.p.m. Storage capacity is unknown.

Water quality from both sources is not known. Routine sampling should be inaugurated and samples from both wells submitted to the Wyoming Board of Health for bacteriological analyses at semi-monthly intervals.

Sewage disposal at the camp area is accomplished by means of septic tanks. There are six or eight tanks in use, each serving from one to four buildings. Tank sizes vary but the largest ones are approximately 14' x 4' x 4' effective size. The tanks are three-compartment concrete structures. Design used is not entirely satisfactory or in accordance with the best practice, but the tanks appear to function in a satisfactory manner. New tanks should be designed in accordance with Reclamation Manual practices. Tank effluents discharge to leaching beds.

Garbage and other wastes are hauled to a remote dumping area.

Recreational areas have been developed about the reservoir area by the now defunct C.C.C. Sanitation facilities are available in a few instances in the form of pit privies.

The following recommendations are apparent for this installation:

1. Adequate water storage reservoir should be made available to provide sufficient water for all uses. A minimum storage of 30,000 gallons

is suggested.

2. Water samples from both sources should be submitted to the State Board of Health for examination at least twice a month.

3. Any new septic tanks should be designed in accordance with Reclamation Manual requirements.

4. Sanitation facilities at recreation areas should be maintained in good condition at all times and additional facilities provided as necessary.

Lingle Power Plant.

This installation was not visited during this investigation. It is located about 25 miles downstream from Guernsey. Information obtained from the Guernsey office indicates that operator's houses are served with water from a drilled well.

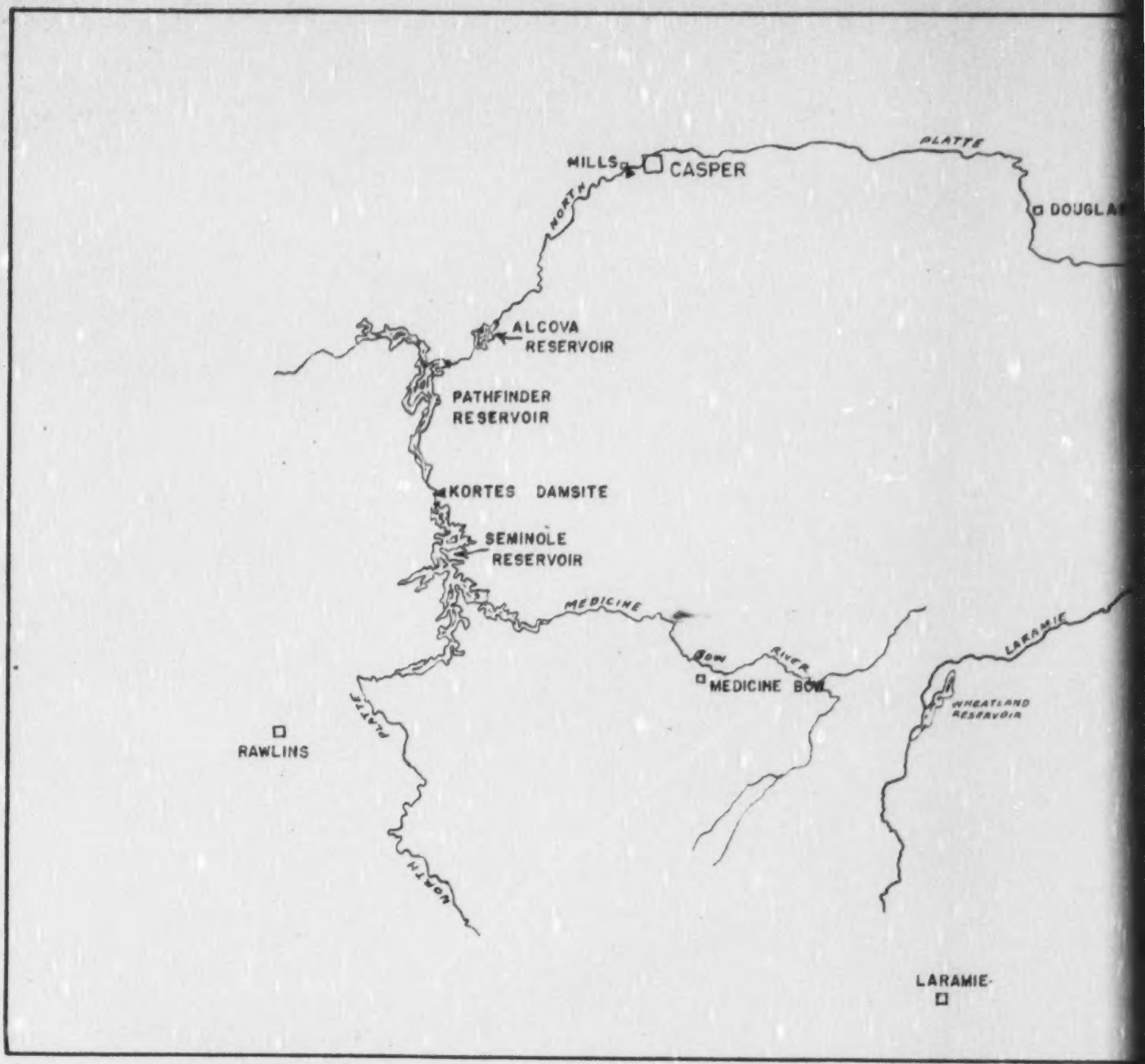
Sewage disposal is direct to the river below the power plant. It is suggested that water quality be checked by submitting samples to the Wyoming Board of Health for tests at semi-monthly intervals, and that a septic tank be constructed to avoid direct discharge of raw sewage into the river as a matter of principle.

General Comments:

The reservoirs and installations in the Wyoming area of the North Platte River District are in a relatively sparsely inhabited area. Oil and ranching are the two main industries. Casper is the largest community. Seminole and Kortes dams are the most isolated, while Guernsey and Alcova are the most accessible. There are latent possibilities of recreational developments at Seminole, but access is difficult during inclement weather. In fact, isolation at this installation is somewhat of a hazard to those quartered at this location, especially in event of a serious illness or accident during the winter.

Limited recreational facilities have been developed at Guernsey. However, the potential hazards which might arise from the normal recreational use of any one of these reservoirs are by no means serious. Nevertheless, where usage of the reservoir areas for recreational purposes is deemed desirable or advantageous, proper facilities for sanitation should be provided at all installations constructed for recreational purposes. As a matter of general principle and of good sanitation practice, no raw sewage or untreated septic tank effluent should be permitted to enter the reservoirs. The Wyoming State Board of Health should be consulted as to their requirements concerning general sanitation practices in these matters. The District Office of the Public Health Service is in a position to arrange all necessary conferences or to act as intermediary between the Bureau of Reclamation and State or local health agencies in any approach to the solution of these problems.

It is assumed that the camps now operating at the Kortes damsite are of a more or less temporary nature and will be operated for only a few years at the most. However, those living and working in this area should have safe water supply, adequate sewage disposal, proper food handling practices, and a generally adequate level of sanitation practices to provide them with at least minimum public health standards. Properly constructed and maintained water supplies and sewage disposal systems, and the maintenance of reasonably good general camp sanitation practices do not entail unreasonable expense for a project of this size and duration. If a permanent camp is established here after completion of construction, every effort should be made to provide permanent facilities in accordance with the standards of the Reclamation Manual. Meanwhile, it is suggested that observed sanitation hazards at these camps be corrected so as to provide maximum protection to the residents during the construction phase of this project.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PLATTE
NORTH
DOUGLAS
ALCOVA
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PATHFINDER
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WHEATLAND
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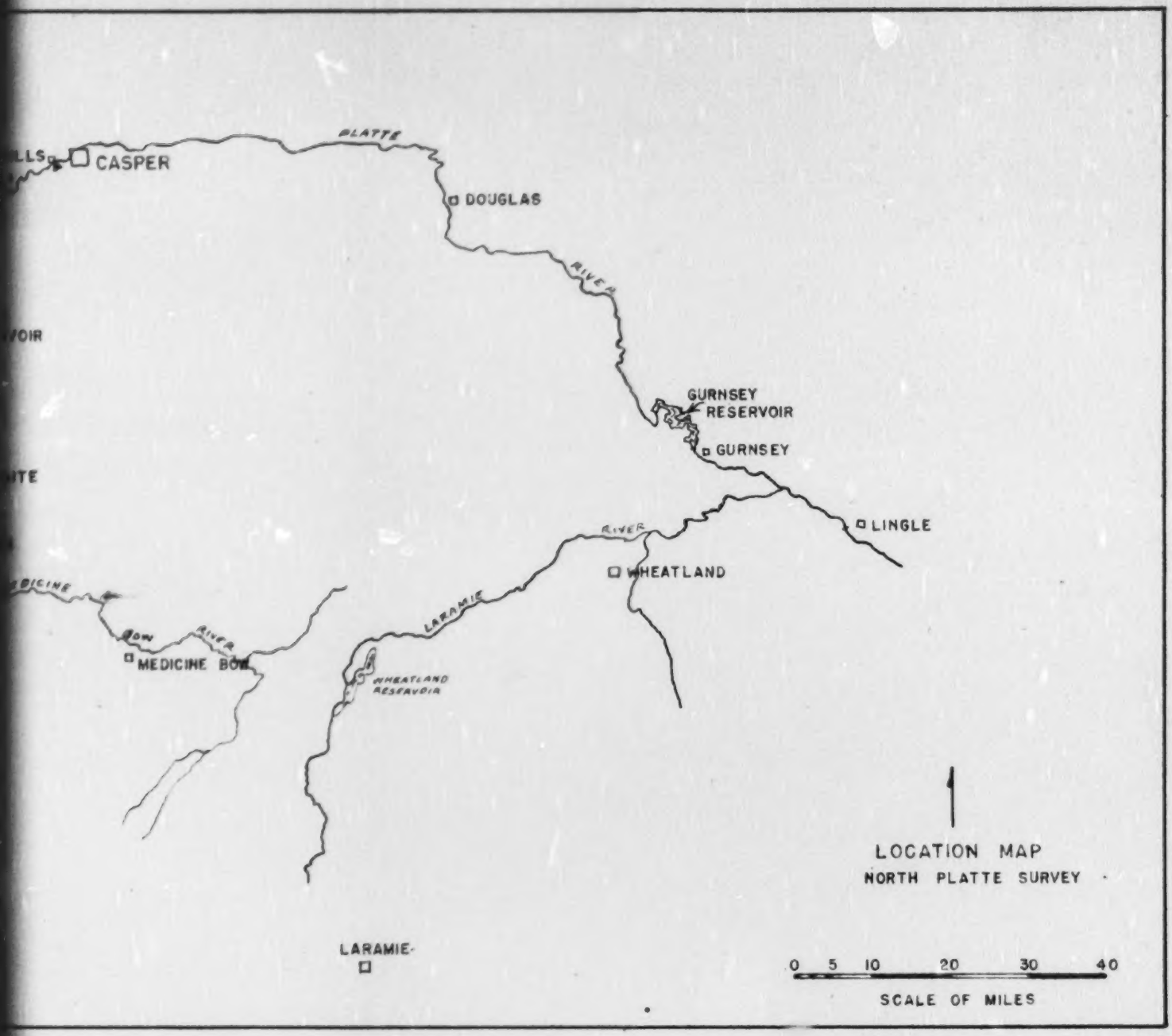
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LOCATION MAP
NORTH PLATTE SURVEY
0 5 10 20 30 40
SCALE OF MILES